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NUCLiB – The Virtual Nuclear Engineering Library on the Internet

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Zusammenfassung

Ein Großteil der Veröffentlichung im Bereich der Kerntechnik erfolgt in Form von Forschungsberichten (Reports), also Grauer Literatur. Sie sind normalerweise nicht über den Buchhandel, sondern meist nur bei der herausgebenden Institution erhältlich. Erschlossene Sammlungen existieren nach unserer Kenntnis in Deutschland nicht.

Die Bibliotheken der beiden Forschungszentren Jülich und Karlsruhe erschließen seit Jahrzehnten Primär- und Sekundärliteratur aus dem Bereich Kerntechnik und angrenzender Gebiete aus dem kerntechnischen Bereich und angrenzender Sachgebiete. Als Beitrag für die Kompetenzerhaltung in der Kerntechnik entwickeln sie derzeit das virtuelle kerntechnische Portal NUCLiB (Nuclear Library) und können somit in Zukunft ein einzigartiges Repositorium von Volltexten für Wissenschaft, Forschung und Anwendung zur Verfügung stellen. Dabei werden die Reports sukzessive digitalisiert und nach Durchführung einer Texterkennung durch automatische Indexierung mit Metadaten versehen werden. Erst mit dieser sachlichen Erschließung sind die Bestände durch Wissenschaftler und Techniker such- und nutzbar. Darüber hinaus wird ein anspruchsvolles Portal mit allen modernen Funktionen entwickelt und angeboten. Bereits jetzt ist eine Demo-Version des Portals unter www.nuclib.de im Internet erreichbar.

Summary

The majority of publications in the field of nuclear engineering appear as reports and are therefore classed as grey literature. They are not usually available in bookshops and in general can only be obtained directly from the publishing institution. To the best of our knowledge, indexed collections do not exist in Germany.

The libraries of both research centres in Jülich and Karlsruhe have been building up collections of primary and secondary literature within the field of nuclear technology and related sub-disciplines, as well as related subject areas, for decades. In order to help maintain competence in nuclear engineering, they are currently developing a virtual nuclear engineering portal, NUCLiB (Nuclear Library), which they will use to make a unique repository of full texts available to science, research and practical applications in the future. The reports are successively digitized and after optical character recognition is performed, they are then automatically indexed with metadata. This objective indexing will allow scientists and technicians to search through and make use of the collections. Furthermore, a sophisticated portal with all of the modern functions will be developed and made available. A demo version of the portal can be accessed online at www.nuclib.de.

Résumé

La majorité des publications dans la discipline de l'ingénierie nucléaire sont des rapports de recherche, c'est-à-dire de la littérature grise. Ils ne sont pas normalement en vente en librairie, mais exclusivement disponible au travers des maisons d'édition. À notre connaissance, une collection indexée n'existe pas en Allemagne.

Les bibliothèques des centres de recherches de Jülich et de Karlsruhe s’enrichissent depuis des décennies de littérature primaire et secondaire dans la discipline de l'ingénierie nucléaire, de ses sous-disciplines et de sujets liés. Pour la conservation de leur compétence en matière d'ingénierie nucléaire, elles développent actuellement un portail virtuel sur l'ingénierie nucléaire, NUCLiB (Nuclear Library), pour but de mettre une collection unique de textes intégraux à disposition de la science, la recherche et l'application pratique. Ce faisant, les rapports sont successivement digitalisé, et après la reconnaissance optique des caractères ils sont indexés grâce à des métadonnées. C’est seulement grâce à cette indexation objective que les

scientifiques et les techniciens peuvent rechercher et utiliser la collection. En outre, un portail sophistiqué avec toutes les fonctions modernes sera développé et mise en place. Une version du portail est dors et déjà disponible en démo sur le site Internet www.nuclib.de.

1. Introduction

There are as many portals as there are grains of sand at the seaside. We have lost count of the number of portals and the variety of topics available worldwide. It is not just libraries and information centres that have stepped up as the willing creators of portals – public authorities, professional associations, all types of institutions, companies, interest groups and private individuals have also taken an active role in the development of portals. The thematic range spans from hobby interests and special-subject portals right up to purely scientific "gateways" into the Internet. There is almost as much variety in the definition of "portal" as there is in the thematic orientation. At the moment, only a very rough concept exists of the idea of a portal. There is no such thing as a standard clear-cut definition[1]. In general, what we understand a WEBPORTAL to be is a website that brings together information that is regularly required on a particular range of topics. In this sense, we have long searched for a page like this containing materials and resources on the topic of "nuclear engineering". Here there is clearly a desideratum and we hope to fill it by creating the Nuclear Library (NUCLiB). In order to do so, we will use the unique holdings of the central libraries of Research Centre Jülich and Forschungszentrum Karlsruhe – the so-called reports. NUCLiB aims to set up and establish a portal for nuclear engineering with a full text search function, which is linked to an order function based on the shopping basket model, as well as a bibliographic database search function. It will also make nuclear engineering information available with an expert search function and first-class link lists.

2. Initial Situation

Research institutions publish their scientific findings in "reports" which are then submitted to the client as research reports (general, interim or end reports) detailing the respective stage that a research project is at. Clients (usually in the sense of sponsors) could be state authorities (e.g. ministries), international organisations (e.g. European Union, IAEA), institutions for the promotion of research (e.g. DFG), as well

[1] http://de.wikipedia.org/wiki/Webportal

as companies. Reports can appear under the name of the client, as well as under the name of the research institution responsible for conducting the research.
Normally, reports can be clearly identified by means of a so-called report number. This number usually consists of a code made up of letters and numbers (e.g. ORNL-2852). Reports belong to what is known as “grey literature”. They are not usually available through bookshops but must rather be ordered from the publishing institution or from special agencies (e.g. National Technical lnformation Service (NTIS)). Some reports contain confidential information that is only intended for the client. These are therefore not available to the public at large or are only made available after a set blocking period has elapsed.
Reports can generally be recognised by their very unique appearance in that there is often very little attention paid to typographic layout or editorial assistance. Reports often contain very detailed descriptions of the experiment and are, for example, of particular importance for nuclear and aeronautical research. They often contain important and sometimes in-depth information that cannot be found in the same detail in journal articles. Reports can be as short as a few pages or as long as a few hundred.
Acquiring and making very specialised scientific and technical specialist literature available, including reports, is a task for which the National Library of Science and Technology/University Library (TIB/UB) in Hannover is responsible as the central special library in Germany. In this role, the library can naturally boast an extremely extensive collection of report literature, which has been considerably boosted through the acquisition of reports from the library of FIZ Karlsruhe (partial former holdings of Forschungszentrum Karlsruhe). TIB does its best to try and get a copy of reports that it does not possess, which customers from their own library or other libraries have requested. Not all of the reports are catalogued in the online catalogue. Report literature can generally be ordered via all delivery channels (traditional interlibrary loans, but also TIB’s own document delivery service TIBORDER). Lists of both complete and incomplete available holdings of the most important series of national and international report literature can also be accessed via TIB’S website

By and large, in most cases a report can be acquired, once the code is known. As reports are only very rarely indexed in terms of content, a metadata search will prove

of little help. Often, and indeed also in TIB Hannover[2], reports that are not yet officially fully indexed are recorded in online catalogues.

In the field of nuclear engineering, the proportion of reports in terms of the entire available literature is particularly high. One of the reasons for this is that research in this field is generally conducted by larger research institutions that tend to publish their own report series. Another reason is that a large proportion of the results fall under licensing, patent and copyright law and are sometimes subjected to access and distribution restrictions under the Treaty on the Non-Proliferation of Nuclear Weapons ("classified"). The publication of all details in journals is therefore often ruled out. Such limited availability and the inability to search nuclear engineering literature has negative effects on science and technology. First of all, maintaining competency in the field of nuclear engineering becomes even more difficult than it already was because of the lack of available literature. Secondly, knowledge of old nuclear engineering facilities is becoming more and more important because these are now being dismantled in the medium-term, either because of political resolutions or due to technical requirements. At the same time, the peaceful use of nuclear energy is undergoing something of a renaissance in the political arena, or to be more specific when it comes to the provision of energy in the future.[3] Information from the construction period of these facilities will therefore become more important in future, particularly in terms of safety-related issues. For nuclear engineering facilities built according to Russian designs, the relevant information is particularly difficult to find. This is most likely due to the upheavals in the context of the transformation processes in the former Eastern block states.

[2] http://www.tib.uni-hannover.de/spezialsammlungen/reports/
[3] http://www.n24.de/wirtschaft/wirtschaftspolitik/?n20060611122327000002
http://de.rian.ru/analysis/20060522/48451025.html

3. Nuclear Engineering Portals

The lack of access and inability to search are also reflected in the existing websites dealing with the topic of nuclear engineering. They are exclusively devoted to informing the public about nuclear energy and to the political debate on the topic, rather than to making scientific information and literature available.
Currently, there are three German portals, each with a different approach:

a. www.kernenergie.de[4]

The joint portal site incorporates a total of five individual websites, namely Informationskreis KernEnergie, German Atomic Forum e.V., German Nuclear Society e.V., atw (International Journal for Nuclear Power) and INFORUM GmbH and it has easily understandable information on the peaceful use of nuclear energy[5]. The available full texts include brochures, personal viewpoints and similar material but not scientific and technical literature or special reports.

b. www.kernenergie-portal.de

[4] Identical content can be found on a number of other webpages, e.g. www.atom.de, www.atomenergie.net, www.atomenergie.org, www.atominfo.de, www.atom-info.de, www.atomkraft.org, www.atomkraftwerk.info, www.castor-transporte.com, www.castor-transporte.de, www.castor-transporte.net, www.castor-transporte.org, www.endlager.info, www.endlager.org, www.endlagerung.info, www.endlagerung.org, www.kernenergie.net, www.kernkraftwerk.info, www.kerntechnik.info, www.kerntechnik.org, www.nuklear-transporte.de www.nukleartransport.info, www.nukleartransporte.de, www.nuklear-transporte.com, www.nuklear-transporte.net, www.nuklear-transporte.org, www.zwischenlager.org

[5] http://www.contentmanager.de/magazin/news_h8239_weblication_cms_befeuert_neues.html: "The joint website of Informationskreis KernEnergie, German Atomic Forum e.V., German Nuclear Society e.V., atw and INFORUM GmbH provides visitors with information on the peaceful use of nuclear energy. All of those involved have different functions: Informationskreis KernEnergie (IK) provides information on the peaceful use of nuclear energy and keeps the public debate alive in order to further public acceptance of nuclear energy. The German Atomic Forum e.V. creates a platform for industry, science and politics with aim of promoting the peaceful utilisation of nuclear energy. The German Nuclear Society e.V. is an association of scientists, engineers and other experts that aims to support progress in nuclear engineering. atw is an international specialist journal that provides information on all areas of the peaceful use of nuclear energy. INFORUM GmbH (publishing and administration company) publishes printed matter, audiovisual and other media and organises seminars and conferences on the topic of nuclear energy."

This private website[6] is a collaboration between universities offering courses in the field of nuclear engineering. Literature cannot be searched. The website is supported by the trade group “Nutzen der Kerntechnik” (The Benefit of Nuclear Engineering) and “Junge Generation” der Kerntechnischen Gesellschaft e.V. (Young Generation of the German Nuclear Society e.V.), which is a scientific and technical association of scientists, engineers, technicians and businessmen working in the field of nuclear engineering. The same authors are also responsible for www.kernenergie-wissen.de, where they want to “provide completely unbiased information on nuclear energy”… The pages are only sporadically updated and are therefore not up-to-date.

c. www.kernenergie-info.de

This portal which contains links to www.atomindustrie.de, www.kernenergie-online.de and www.la-hague.de is a quite satirical information page maintained by anti-nuclear activists.

Along with these national nuclear engineering portals, the virtual special libraries for physics (ViFaPhys, http://vifaphys.tib.uni-hannover.de) and for technology (ViFaTec, http://vifatec.tib.uni-hannover.de) run by the National Library of Science and Technology/University Library Hannover (TIB/UB) should also be mentioned. They cover all areas within physics and technology. Specialised nuclear engineering content, on the other hand, only plays a marginal role.

d. www.iaea.org

The pages of the International Atomic Energy Agency represent the most important international nuclear engineering portal by far. IAEA owns the INIS database which can be accessed via STN as the ENERGY database. Here you will find abstracts and metadata but not full texts. In the past, INIS was supported by the holdings of the Central Library of Forschungszentrum Karlsruhe.

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More extensive links are also available, as is the very comprehensive “Nuclear-Knowledge-Base”. The entire website is in English.

e. www.euratom.org

On the webpages of the European Atomic Energy Community, one of the links, namely “publications and reports”, provides access to the full texts of selected reports, conferences, etc., published after 1990. Older literature is not available. An advanced search is not possible here. The webpages are available in English only.

4. Nuclear Engineering Literature in Research Centre Jülich and Forschungszentrum Karlsruhe

Both Research Centre Jülich and Forschungszentrum Karlsruhe currently conduct multidisciplinary research. Both centres were originally founded as nuclear research centres of the federal states of North Rhine-Westphalia and Baden-Württemburg, respectively, and indeed of the Federal Republic of Germany. The libraries of the nuclear research centres provided as comprehensive and complete a collection as possible of nuclear engineering literature. KFA Jülich was also contracted by EURATOM to collect literature from the former Warsaw Pact countries. The vast majority of this valuable collection of nuclear engineering literature consists of reports. The two libraries have over 1.6 million reports from the field of nuclear engineering and related areas at their disposal. These are available in print, microfiche and microcard.

	Paper	Microform	Total
Jülich	148	420	568
Karlsruhe	213	900	1113
Total	561	1320	1681

Table 1: Number of reports available in Research Centre Jülich and Forschungszentrum Karlsruhe (thousands).

In 2004, as part of a study semester in the Central Library of Research Centre Jülich, we carried out a feasibility study on the automatic indexing of reports[7]. According to this study, the volume of reports makes the use of automatic indexing processes necessary. For this purpose, selected sections of the reports (title page, table of contents, abstract if available) must exist in a machine-readable format and dictionaries containing the prevailing terminology and the languages used must be created for automatic indexing. Furthermore, it would be useful to integrate thesauri and classification systems into this indexing in order to enable the optimal retrieval of information.

5. Digitalisation of the Collection of Reports

Scanning reports

The entire collection of reports is being scanned and they are being saved as images in consultation with an external contractor, who has the requisite facilities and capacities and certified with regard to aspects of access rights.
In order to allow users conduct efficient searches, various types of searches must be supported. The following services are to be provided:

- make full text searches in the collection of reports possible through automatic text recognition
- make keyword searches possible through automatic indexing
- make metadata searches possible through machine-assisted cataloguing

Since the quality of indexing (which in turn is dependent on the quality of text recognition) influences search and find in the text holdings, different text recognition and indexing programs from different manufacturers are being tested and compared.
In order to optimise indexing, a thesaurus will be specially developed for the nuclear engineering portal.

6. Setting Up a Nuclear Engineering Internet Portal

Although the key component in NUCLiB is the report holdings from the libraries of Research Centre Jülich and Forschungszentrum Karlsruhe, the Internet portal offers functions that go far beyond this, which we have summarised in the following:

- searches in the report holdings
- ordering reports (interlibrary loans)
- full text display – sections depending on access limitations
- collections of nuclear engineering monographs (search and order options)
- collections of nuclear engineering journals (search and show options, depending on licensing agreements in the searcher's institution)
- lists of relevant nuclear engineering databases (search and show options, depending on licensing agreements in the searcher's institution)
- calendar of relevant nuclear engineering congresses and conferences
- first-class link lists

7. NUCLiB in the Internet

You can access NUCLiB's web portal at www.nuclib.de or www.nuclib.org. The following provides an outline of the most important features for library/bibliographic searches currently offered by NUCLiB as a portal or features that will be available in the future.

Searches in NUCLiB

[7] Jens Wille: Erschließung von Reports der Kerntechnik und verwandter Gebiete. Jülich, January 2005

The most important thing in a library portal is the ability to search its holdings. To this end, you can search the catalogues of both libraries in Jülich and Karlsruhe simultaneously using a search engine.

News

When you click on this button – in conjunction with other nuclear engineering forums – you will gain access to things like:

- forums and newsletters with full text access, e.g. Nuclear Data Newsletter, Nuclear Data Sheets
- events (screenshot 1)

Information on special subjects / links

As well as subsections such as “IAEA Data Center, and “reports”, and also “nuclear energy and nuclear engineering libraries”, NUCLiB also lists a number of relevant fact databases, bibliographic databases and project databases on the same topic on its webpages. As long as licenses allow it, the databases can be opened directly from the portal (screenshot 3).

Journals

- Alphabetical lists:

The webpages contain a fairly comprehensive alphabetical list of journals relevant to nuclear engineering. The full text of some of these journals is either freely accessible or you can request access by filling in an order form. The table of contents and abstracts can be freely searched in most journals (screenshot 2).

- Journal contents service:

While “search in NUCLiB” and in the alphabetical lists of journals only allow you to search according to the bibliographic data of a journal (name, publisher, …), the journals contents service allows you to search on the level of the article (author, title, …).

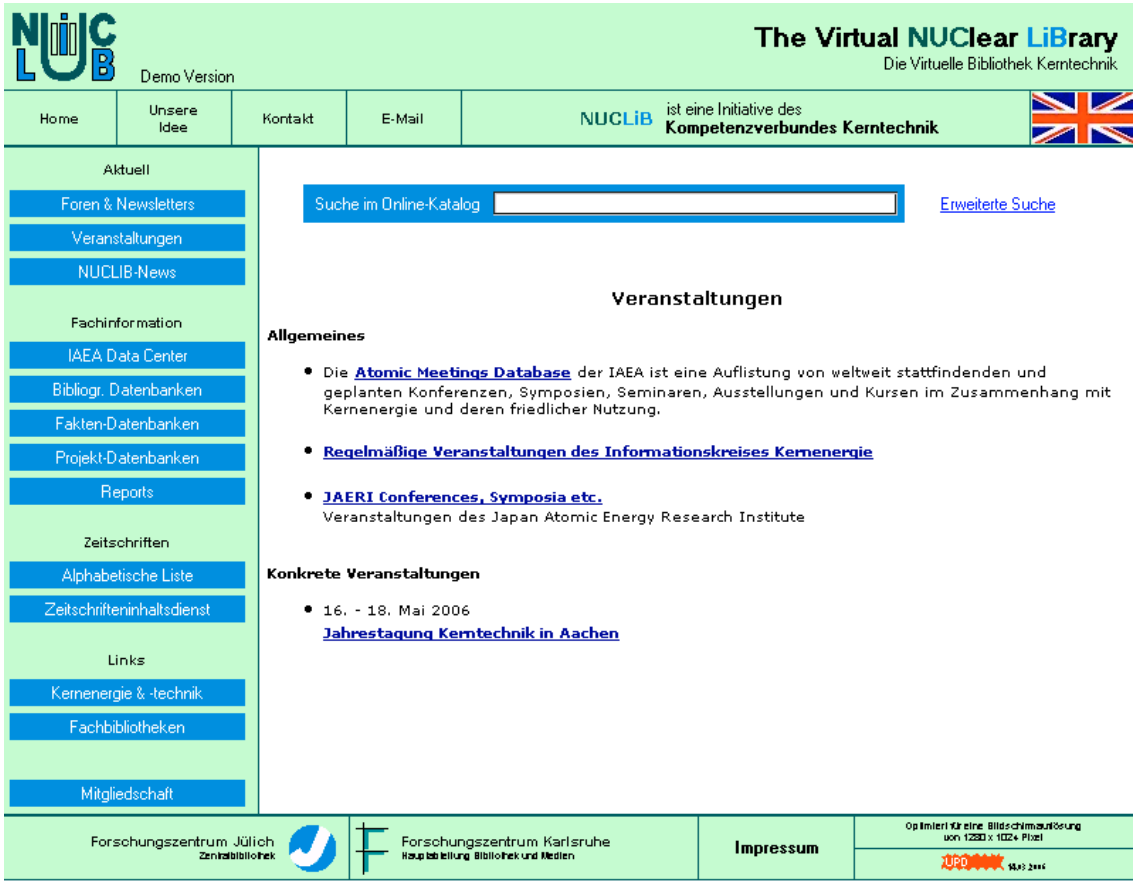
- Day-to-day administration:

The portal will be hosted on a long-tem basis in both research centres. The Central Library of Research Centre Jülich will be responsible for keeping the portal up to date in the long term. The Library of Forschungszentrum Karlsruhe will be responsible for public relations with universities, research institutions, companies and public authorities dealing with nuclear engineering.

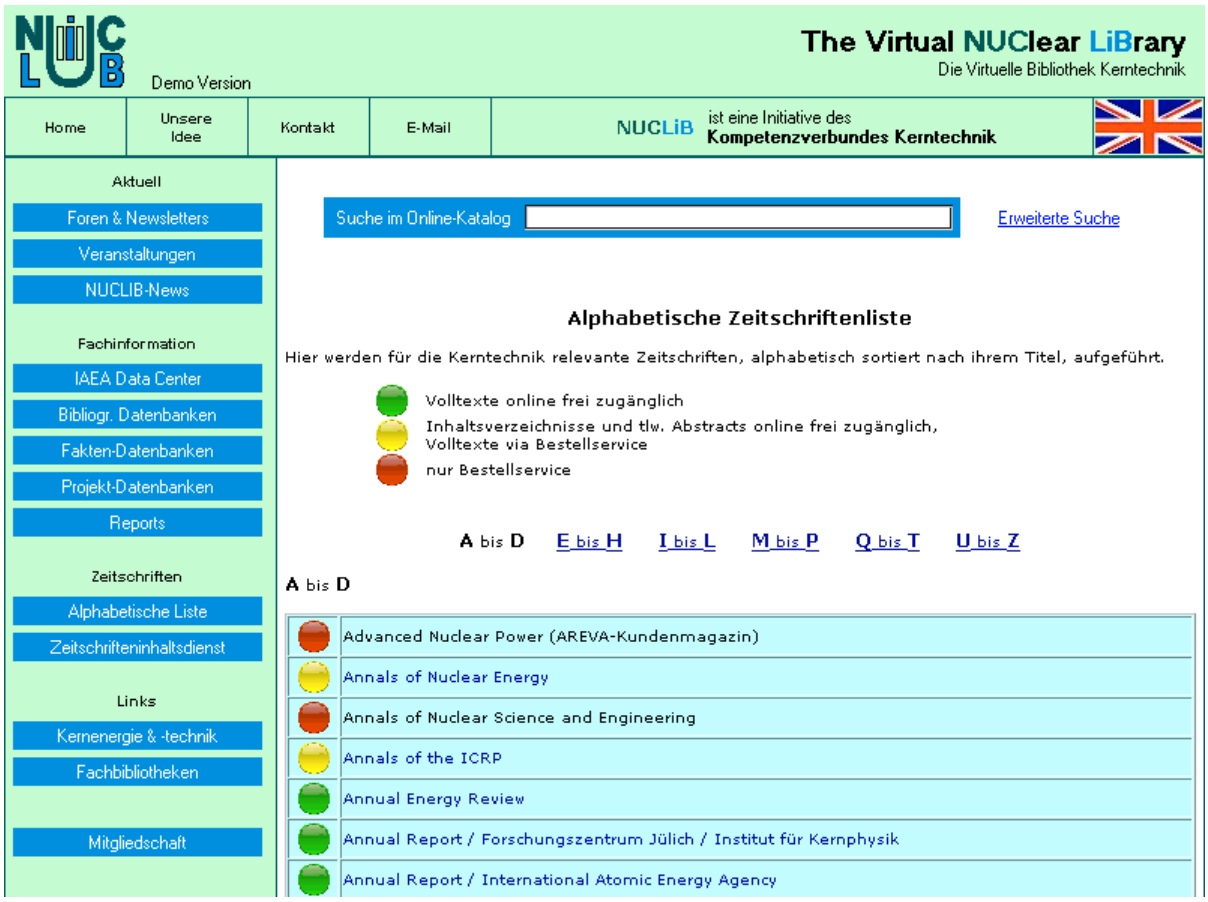
8. Conclusions

The virtual nuclear engineering portal NUCLiB hopes to maintain competence and thereby close an important gap in information on special subjects. In no way do the libraries involved wish to embark upon competition with other nuclear engineering portals but rather they hope to cooperate as effectively as possible with them. The same is true of other libraries with appreciable holdings of literature on nuclear engineering. The express intention is therefore to incorporate more relevant libraries into the portal.

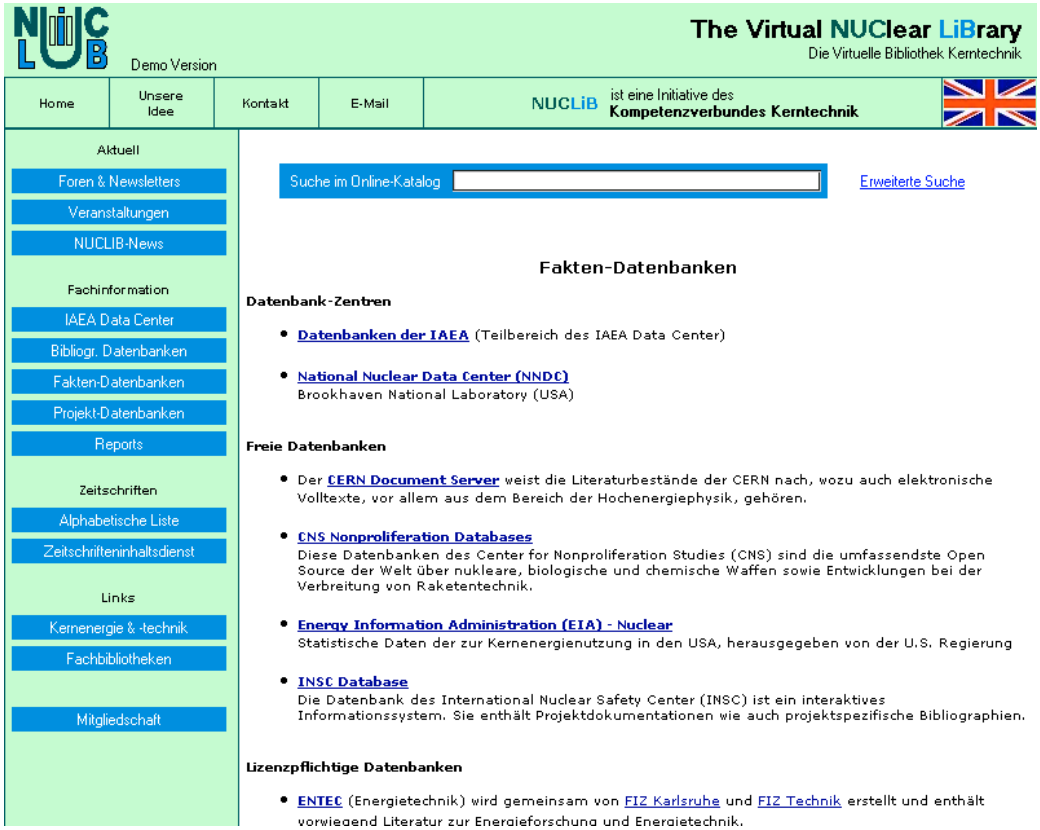
Figures:



Screenshot 1: http://www.nuclib.de/de/veranstaltungen.html



Screenshot 2: http://www.nuclib.de/de/alphabet_liste/al_a-d.html



Screenshot 3: http://www.nuclib.de/de/dbs_fakten.html